

and the observations made by eye and ear. It was difficult to fix the exact times of the contacts of the ring in consequence of its great ellipticity. A star of about the eighth magnitude, which I took to be Titan, disappeared suddenly, but, owing to the overpowering brilliancy of the bright limb, its reappearance could not be observed. It became visible when two or three minutes of arc from the limb. The brilliancy of the planet was, of course, very much less than that of the Moon. This is the third occultation of Saturn seen at this Observatory.

*The Peninsula, Windsor, N. S. Wales :*  
1906 November 25.

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*Mean Areas and Heliographic Latitudes of Sun-spots in the Year 1905, deduced from Photographs taken at the Royal Observatory, Greenwich ; at Dehra Dûn ; at Kodaikânal Observatory, India ; and in Mauritius.*

(Communicated by the Astronomer Royal.)

The results here given are in continuation of those printed in the *Monthly Notices*, vol. lxvi. p. 85, and are deduced from the measurements of photographs taken at the Royal Observatory, Greenwich ; at Dehra Dûn ; at the Kodaikânal Observatory, India ; and at the Royal Alfred Observatory, Mauritius.

Table I. gives the mean daily area of umbræ, whole spots, and faculæ for each synodic rotation of the Sun in 1905 ; and Table II. gives the same particulars for the entire year 1905 and the four preceding years, for the sake of comparison. The areas are given in two forms : first, projected areas ; that is to say, as seen and measured on the photographs, these being expressed as millionths of the Sun's apparent disc ; and next, areas as corrected for foreshortening, the areas in this case being expressed in millionths of the Sun's visible hemisphere.

Table III. exhibits for each rotation in 1905 the mean daily area of the whole spots (corrected for foreshortening), and the mean heliographic latitude of the spotted area for spots north and for spots south of the equator, together with the mean heliographic latitude of the entire spotted area and the mean distance from the equator of all spots ; and Table IV. gives the same information for the year as a whole, similar results for the four preceding years being added, as in the case of Table II.

Tables II. and IV. are thus in continuation of the similar tables for the years 1874 to 1888 on pp. 381 and 382 of vol. xlix. of the *Monthly Notices*, and for the years 1889 to 1902 on pp. 465 and 466 of vol. lxiii., and for the years 1901 to 1904 on pp. 86 and 87 of vol. lxvi.

The rotations in Table I. and Table III. are numbered in continuation of Carrington's series (*Observations of Solar Spots made*

at Redhill, by R. C. Carrington, F.R.S.), No. 1 being the rotation commencing 1853 November 9. The assumed prime meridian is that which passed through the ascending node at mean noon of 1854 January 1, and the assumed period of the Sun's sidereal rotation is 25.38 days. The dates of the commencement of the rotations are given in Greenwich civil time, reckoning from mean midnight.

TABLE I.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Photographs were taken.	Mean of Daily Areas.					
			Projected.			Corrected for Fore-shortening.		
			Umbrae.	Whole Spots.	Faculae.	Umbrae.	Whole Spots.	Faculae.
686	1905. d Jan. 5.53	28	229	1655	1987	166	1255	2128
687	Feb. 1.87	27	395	2746	2584	270	1938	2703
688	Mar. 1.20	28	229	1992	2234	155	1385	2394
689	28.52	27	99	632	2194	66	421	2333
690	Apr. 24.80	27	170.	1145	1865	113	782	2009
691	May 22.02	27	87	567	2348	65	437	2632
692	June 18.22	27	222	1523	2309	156	1123	2533
693	July 15.43	28	309	2174	2633	230	1672	2902
694	Aug. 11.64	27	181	1200	3057	130	882	3238
695	Sept. 7.89	27	136	916	2476	98	692	2642
696	Oct. 5.16	28	399	3096	2401	288	2206	2610
697	Nov. 1.45	27	365	2607	3009	263	1939	3176
698	28.76	27	190	1204	2707	133	850	2829

TABLE II.

Year.	No. of Days on which Photographs were taken.	Mean of Daily Areas.					
		Projected.			Corrected for Foreshortening.		
		Umbrae.	Whole Spots.	Faculae.	Umbrae.	Whole Spots.	Faculae.
1901	359	14	41	23	9	29	29
1902	349	14	86	163	10	62	178
1903	350	67	434	875	51	340	970
1904	363	93	653	1639	67	488	1761
1905	364	230	1637	2433	163	1191	2612

TABLE III.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Photographs were taken.	Spots NORTH of the Equator.		Spots SOUTH of the Equator.		Mean Heliographic Latitude of Entire Spotted Area.	Mean Distance from Equator of all Spots.
			Mean of Daily Areas.	Mean Heliographic Latitude.	Mean of Daily Areas.	Mean Heliographic Latitude.		
686	1905. d Jan. 5.53	28	594	11°88	661	15°29	- 2°44	13°68
687	Feb. 1.87	27	682	13°37	1256	16°75	- 6°14	15°56
688	Mar. 1.20	28	875	10°52	510	16°48	+ 0°58	12°71
689	28.52	27	175	16°42	246	18°08	- 3°71	17°39
690	Apr. 24.80	27	439	16°55	343	15°88	+ 2°34	16°26
691	May 22.02	27	224	11°61	213	14°25	- 0°99	12°90
692	June 18.22	27	688	9°52	435	14°47	+ 0°23	11°44
693	July 15.43	28	1142	12°55	530	14°96	+ 3°83	13°31
694	Aug. 11.64	27	638	12°04	245	17°65	+ 3°81	13°60
695	Sept. 7.89	27	423	13°69	268	14°38	+ 2°80	13°96
696	Oct. 5.16	28	2168	11°31	38	13°74	+ 10°88	11°35
697	Nov. 1.45	27	1422	9°59	517	14°71	+ 3°11	10°96
698	28.76	27	429	10°55	421	15°31	- 2°25	12°91

TABLE IV.

Year.	No. of Days on which Photographs were taken.	Spots NORTH of the Equator.		Spots SOUTH of the Equator.		Mean Heliographic Latitude of Entire Spotted Area.	Mean Distance from Equator of all Spots.
		Mean of Daily Areas.	Mean Heliographic Latitude.	Mean of Daily Areas.	Mean Heliographic Latitude.		
1901	359	22	8°59	7	16°27	+ 2°82	10°37
1902	349	42	18°81	21	15°29	+ 7°48	17°64
1903	350	132	18°11	208	21°15	- 5°85	19°94
1904	363	268	16°33	220	16°88	+ 1°37	16°57
1905	364	750	11°66	440	15°55	+ 1°60	13°10

The principal features of the record for 1905 are—

1. The great increase in the mean daily spotted area as compared with 1904, both the umbræ and the whole spots showing an advance of 144 per cent. The actual area attained, 1191, surpassed that of the year 1883, the year of maximum in the first complete cycle registered at Greenwich.

2. This increase has been fairly general throughout the year, no fewer than seven rotations in 1905 exceeding in area the most active rotation of 1904. Three periods of remarkable activity were noticed,—the first three months of the year, the month of July, and the months of October and November.

3. The faculæ have, as usual, maintained a more steady rate of advance than the spots, the mean daily area showing no great fluctuation from one rotation to another, and the whole year showing an advance upon 1904 of only 48 per cent.

4. Comparing the whole spots of the two hemispheres, the northern hemisphere has preserved and increased its superiority over the southern, the area for the former being to that of the latter as 63 to 37. In the two preceding cycles this proportion between the two hemispheres was reached about two years before the maximum, the balance being heavily in favour of the southern hemisphere by the time the maximum was reached.

5. Notwithstanding this small relative activity of the southern hemisphere, usually much the more disturbed at maximum, the distribution of spots in latitude appears to point to 1905 having been the year of maximum of the present cycle, since the mean distance from the equator of all spots barely exceeded  $13^{\circ}$ . This corresponds very closely to the values obtained in 1883 and 1893, the years of maximum in the two preceding cycles.

6. Whilst the Sun was never free from spots in 1904, there were two days on which this occurred in 1905.

7. The distribution of spots in latitude was somewhat wider than in 1904, every latitude from the equator up to  $32^{\circ}$  being represented, an arrangement usually characteristic of the maximum year of the cycle.

8. The number of separate groups of spots was 355, as compared with 276 in the previous year. The average size of the groups was nearly double that observed in 1904. Indeed, the most striking peculiarity of the Sun-spot record in 1905 was the great number of abnormally large groups; Group No. 5441, seen from 1905 January 29 to February 11, attaining on four consecutive days a greater area than that of any other spot as yet included in the Greenwich measures.

9. Of the 353 separate groups, 209 were in the northern hemisphere and 144 in the southern.

*Royal Observatory, Greenwich :*  
1907 January 8.

*Observations of Minor Planets from Photographs taken with the 30-inch Reflector of the Thompson Equatorial at the Royal Observatory, Greenwich, during the year 1904.*

*(Communicated by the Astronomer Royal.)*

The following positions of minor planets were obtained from photographs taken with the 30-inch Reflector during the year 1904.

The plates were measured with the astrographic micrometer. Four reference stars were, as a rule, measured with the planet, their positions being derived when possible from the Catalogues of the Astronomische Gesellschaft.

The positions given are not corrected for Parallax.

$\log \text{Parallax Correction} = \log \text{Parallax Factor} - \log \Delta.$

Date and G.M.T. 1904.				Apparent R. A.			Apparent Dec.			Log. Parallax Factor.	
d	h	m	s	h	m	s	°	'	"	R.A.	Dec.
(388) Charybdis.											
Feb. 15	11	14	15	8	37	23.50	+25	8	58.7	+8.423	+0.588
(37) Fides.											
Feb. 13	9	16	7	8	38	15.32	+22	51	42.0	-9.271	+0.646
15	10	20	15	8	36	30.84	+22	54	28.3	-8.817	+0.624
17	10	31	32	8	34	53.47	+22	56	38.6	-8.469	+0.621
18	9	0	26	8	34	10.21	+22	57	28.1	-9.241	+0.642
(106) Dione.											
Feb. 8	10	43	15	8	51	22.22	+24	1	3.2	-9.002	+0.612
13	9	40	59	8	47	21.28	+24	15	35.3	-9.217	+0.622
15	10	45	13	8	45	46.07	+24	20	50.0	-8.605	+0.601
17	11	14	14	8	44	15.15	+24	25	34.7	+8.448	+0.599
18	9	24	5	8	43	34.78	+24	27	36.0	-9.192	+0.617
(313) Chaldea.											
Feb. 13	10	7	58	9	22	52.37	+1	43	1.5	-9.210	+0.826
18	9	45	8	9	19	6.55	+2	46	31.8	-9.206	+0.820
(505) Cava.											
Feb. 15	7	7	9	4	59	26.67	+25	19	57.2	-8.423	+0.585